DOCUMENT RESUME

ED 268 983 IR 012 048

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TITLE Guidelines for Educational Software in California Schools. Revised.
INSTITUTION California State Dept. of Education, Sacramento.
PUB DATE 17 Sep 85
NOTE 15p.
PUB TYPE Guides - Non-Classroom Use (055)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Computer Assisted Instruction; *Computer Software; Elementary Secondary Education; *Evaluation Criteria; Guidelines; Instructional Material Evaluation; *Microcomputers; State Departments of Education; *State Standards
IDENTIFIERS *California; Software Evaluation

ABSTRACT

Designed to provide guidance to teachers and other educators with responsibility for selecting educational software, these guidelines for computer software selection are organized into three sections: essential attributes, desirable attributes, and indicators of excellence. The criteria in each section are further subdivided into three subsections--educational content, technical features, and support materials. Educational content relates to the educational materials to be presented and the teaching/learning strategies used. Technical features refers to ease of the program's operation. Support materials are the supplementary materials that teachers and students must have to operate the program. Also included in this document is a section on marketing practices of manufacturers and distributors that should be encouraged by California consumers of educational software. (JB)

Guidelines for Educational Software in California Schools

Produced by the Educational Technology Unit
California State Department of Education

Aproved on December 6, 1984, by the
Educational Technology Committee
Revised September 17, 1985

CALIFORNIA STATE DEPARTMENT OF EDUCATION
Bill Honig, Superintendent of Public Instruction
Sacramento, 1985

This document was published by the California State Department of Education, 721 Capitol Mall, Sacramento, CA 95814-4785, and distributed under the provisions of the Library Distribution Act and *Government Code* Section 11096

1985

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Acknowledgments

The guidelines for educational software were created to meet a requirement in Assembly Bill 803 (Chapter 1133, Statutes of 1983, Section 51873.1 (f)) that standards for educational software be produced and that they be used in the purchase of educational software in California schools. The guidelines were produced with the help of the following educators and software specialists. The State Department of Education is grateful for their contributions.

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INTRODUCTION

The guidelines presented in this document are designed to serve as a foundation for the evaluation of educational software, and it is expected that they will be revised and updated periodically. The guidelines should, with wide dissemination throughout California schools, provide guidance to teachers and others having the responsibility for selecting educational software. It is hoped that the guidelines will also provide to developers of educational software direction regarding the expectations of the educational marketplace in California.

The guidelines are organized in three sections:

- ESSENTIAL ATTRIBUTES

  Essential attributes are the criteria that should be met by any piece of educational software to be used in California schools.

- DESIRABLE ATTRIBUTES

  The criteria described in this section are regarded as highly desirable in all educational software.

- INDICATORS OF EXCELLENCE

  The criteria described in this last section represent goals that manufacturers should strive for in software development. Some of these criteria are already being met by publishers of quality software.

The criteria in each section are further divided into three subsections: educational content, technical features, and support materials. Educational content relates to the educational material to be presented and the teaching/learning strategies used. Technical features deal with the program's operation. Support materials are the supplementary materials that teachers and students must have to operate the program.

Also included in this document is a section on marketing practices that should be encouraged by California consumers of educational software.

The California State Department of Education expects that various agencies will decide to base their reviews and recommendations to purchase on these criteria. In light of the need for a process and criteria by which to evaluate software which is being considered for state adoption in conjunction with other instructional materials, the committee which developed these Guidelines has endorsed their use in the instructional materials adoption process.

Finally, the reader should be aware that in instances other than evaluation for adoption, these guidelines are intended to be exemplary in their application; compliance with them is not mandatory. However, the reader should also bear in mind that all educational software and documentation MUST comply with the state-mandated guidelines set forth in Standards for Evaluation of Instructional Materials with Respect to Social Content (Sacramento: California State Department of Education, 1983).

ESSENTIAL ATTRIBUTES OF EDUCATIONAL SOFTWARE

The following criteria represent the minimal standards that should be met by any piece of educational software used in California schools.

EDUCATIONAL CONTENT

- All content is factually accurate.
- All punctuation, spelling, grammar, usage, capitalization, paragraphing, syllabication, syntax, and diction are correct, except when instructional strategies require the presentation of incorrect material.
- Responses to learners are appropriate, positive, and non-judgmental.
- The skill levels (reading, typing, etc.) required to operate the program are commensurate with the skill levels being taught or practiced.
- Instructions are clear, concise, and complete.
- The objectives of the instruction are explicitly stated or readily apparent to the learner.

TECHNICAL FEATURES

- The users can easily and independently operate the program.
- The program is reliable in normal use.
- The software is free of programming errors and runs efficiently, with minimum delays.
- The program operates as specified in the instructions.
- Screens are well formatted, and the use of color and graphics is appropriate.
- All audio can be controlled by the teacher or the learner except when the sound is an essential element of the instructional strategy.
- The pace of the program can be controlled by the teacher or the learner unless pacing is an essential element of the instructional strategy.
- Expected learner responses for program operation are consistent throughout.

- Unanticipated learner input does not disrupt program operation.
- Maps, graphs, and other illustrations are clear and simple to interpret.

SUPPORT MATERIALS

- All punctuation, spelling, grammar, usage, capitalization, paragraphing, syllabication, syntax, and diction are correct.
- Documentation includes at least the following elements:
  - A description of the hardware elements required to use the program (e.g., minimum memory, color display, printer, number of disk drives, voice synthesizer, joy sticks, paddles, and graphics tablets)
  - Procedures for installing the software (e.g., transfer to hard disk, initialization of file or learner work disks)
  - Instructions for use

DESIRABLE ATTRIBUTES OF EDUCATIONAL SOFTWARE

The criteria described in this section are regarded as desirable in any piece of educational software.

EDUCATIONAL CONTENT

- The program contains multiple levels of difficulty which may be selected by the learner or the teacher.
- Motivational devices are appropriate to the content and skill levels being taught or practiced.
- The interest level and the vocabulary are well suited to the learners.
- The program provides helpful responses to the learner's errors.
- The learner remains in control of the program and is actively involved in the learning process.
- The instructional design is based on appropriate learning strategies.
- When appropriate, the program branches to harder or easier content in accordance with the learner's responses.
- Any game format utilized for instruction, reinforcement, or motivation is appropriate and enhances the overall instructional design.
- Where simulations are used, the models and data are valid and are not oversimplified.
- The program represents an effective use of the computer.

TECHNICAL FEATURES

- Instructional content can be adapted to include individualized word lists, problem sets, etc.
- Program operation requires minimal teacher intervention.
- Content is presented in random sequence, when appropriate.
- A menu allows learners to access directly specific parts of the program.
- Learners can correct responses before the responses are accepted by the program.

Learners can access operating instructions or HELP screens from any part of the program.

- Learners can bypass instructions at will.
- Learners can exit from any point in the program through an established escape sequence.
- Colors are selected for maximum discrimination when used on non-color screens.
- If record-keeping modules are included, they are protected from unauthorized access.
- If there is a record-keeping component, a minimum of 40 students can be accommodated.

SUPPORT MATERIALS

- Documentation includes at least the following items for the teacher's and the student's use:
  - Descriptions of content in terms of specific objectives or skills to be acquired or practiced
  - Prerequisite learner's skills
  - Expected time needed for successful execution of the program
  - Expected learner's outcomes
  - Suggestions for integrating the program into the curriculum
  - Suggestions for using the program in various instructional settings
  - Suggested classroom activities
  - A list of any books, equipment, or other materials required for use with the program
  - Pictures of representative program screens
  - A sample program run

INDICATORS OF EXCELLENCE IN EDUCATIONAL SOFTWARE

The criteria addressed in this section, some of which are already being met by publishers, represent future directions in software development. Educators are actively seeking software that contains these features. They represent the ideas of today; new criteria will evolve as hardware and software technology improve and instructional design becomes more sophisticated.

EDUCATIONAL CONTENT

- The program utilizes innovative approaches and encourages creativity on the part of the learner.
- The learner is encouraged to use higher order thinking skills, such as application, analysis, synthesis, and evaluation when appropriate.
- Alternative methods of presenting the content are used and are based on the learner's responses.
- The program provides for open-ended, natural language responses.
- The program presents material not easily provided by other methods or engages the learner in experiences not readily duplicated in the real world.
- The program presents ideas and theories in a manner that makes them accessible to learners at earlier grades than the traditional curriculum could.

TECHNICAL FEATURES

- The program provides for various learning modalities--e.g., auditory, kinesthetic, and visual--where appropriate.
- The program uses other technologies, such as speech synthesis, videotapes, videodisk, or audiocassette, to enhance the learning experience, when appropriate
- The program makes use of alternative input sources, such as voice, light pen, mouse, and graphics tablet, when appropriate.
- The learner can exit the program from any point and return to that point directly from the beginning of the program and maintain previous work, or record of progress, intact.

- The learner can go back through the program on demand to review responses and the content.

- A comprehensive learner management component is included, if appropriate.

- The program includes the capability of printing appropriate instructional segments, performance records, learner-created materials, etc.

SUPPORT MATERIALS

- Teacher and classroom materials should:

  - Describe the specific learning theories on which the instructional design is based.

  - Include suggestions for a broad range of classroom applications.

  - Contain masters for transparencies and learners' materials.

  - Include well-designed pretests and post-tests, as appropriate.

  - Describe the correlation of the material to standard textbook series, curriculum frameworks, and standards, as appropriate.

  - Describe learners' outcomes obtained from field testing in a variety of settings.

  - Include additional references and resource materials.

  - Identify the previous work and background qualifications of the author(s).

CONSUMER AWARENESS

The consumer awareness issues listed below are important to all California educators involved in the evaluation and acquisition of educational software. They represent practices that many distributors and publishers have established as marketing policy and that will increasingly help ensure the availability of high quality software to California schools. Educators purchasing software are urged to determine which of these policies have been implemented by the distributors and publishers with whom they do business.

A parallel issue is that of copyright protection for educational software. The California State Board of Education has endorsed a model district policy on illegal copying of software entitled "Suggested District Policy on Software Copyright," which was developed by the International Council for Computers in Education. Furthermore, the State Department of Education is distributing copies of this policy to all districts in California and recommending that each district adopt it or a similar policy. Districts that have such a policy in place may well have an advantage in negotiating licensing agreements with distributors or publishers.

Consumers are urged to inquire whether manufacturers and distributors do the following:

- Provide for free preview of software and documentation.
- Provide refunds for software that fails to operate as described in the documentation.
- Provide licensing agreements that permit users to make multiple copies of software or that provide multiple copies at reduced prices (site license).
- Provide a network compatible version of software and licensing agreements that permit placing software on a hard disk for access by multiple computers (network license).
- Provide a backup copy or a procedure for making a backup copy.
- Provide free or inexpensive updates on software when new versions become available.
- Provide for replacement of damaged software at nominal cost.
- Provide dealer support and/or teacher training as appropriate.

- Provide a method for soliciting recommendations for the improvement of a software package and offer incentives for suggestions which are incorporated in subsequent versions.

- Provide multiple sets of consumable materials at a reasonable cost.

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